

5.0 ACCIDENT ANALYSIS

5.1 FRS Structural Failure Hazards

The Pajarito Canyon FRS was designed and built to withstand a range of environmental loading conditions and not fail or cause a major accident to occur. The structure is constructed of RCC on volcanic tuff. Its primary function is to provide retention and controlled release of water associated with the 100-year, six-hour storm. It was evaluated for four loading conditions:

- Loading conditions 1, normal, reservoir empty;
- Loading conditions 2, unusual, floodwaters from 100-year, six-hour storm;
- Loading conditions 3, extreme, floodwaters from probable maximum flood; and
- Loading conditions 4, extreme, reservoir empty subjected to 0.22 g peak ground acceleration earthquake.

The evaluation also looked at available information on the geological and subsurface features at or near the structure and the construction records. The conclusions from this evaluation are as follows.

1. For all loading conditions, the structure can be considered stable against overturning.
2. For sliding through or separating RCC sections, the analysis indicates that major factors of safety in excess of target levels exist for all loading conditions using the RCC strength assumed in the design of the structure.
3. For sliding through or shifting the FRS on the foundation materials, the factors of safety are much greater than the target factors of safety for three of the four loading conditions evaluated. For the probable maximum flood loading condition, the factor of safety is at the target level.

In summary, an evaluation of the design parameters of the FRS and the limited amount of geological information for the site did not reveal any serious or potential problems concerning the integrity of the structure. Therefore, a catastrophic collapse or failure of the FRS would not be expected to occur under various normal, unusual, or extreme conditions.

5.2 Demolition (Construction) Hazards

Potential accidents associated with the Proposed Action and Disassembly Alternative are most likely to occur in relation to demolition activities. Demolition is considered in national statistics on construction accidents and, so, can be considered by comparing national statistics on construction with project worker information for the Proposed Action and Disassembly Alternative. Hazards for the Proposed Action (partial removal of the FRS) and the Disassembly Alternative can be grouped into construction hazards and transportation hazards. No fatalities are likely to result from any demolition (construction) or transportation accident scenarios.

To estimate the potential number of fatalities that might occur from demolition-related activities of the Proposed Action, the estimated number of workers was compared to recent risk rates of occupational fatalities. Although fewer than 20 workers would be employed during the non-peak period of work activity over the duration of the project (7 months), 20 workers for the duration of the project was used in the risk calculations as a conservative measure. The average fatality rate in the U.S. is 3.9 deaths per 100,000 workers per year (Saltzman 2001). No deaths (0.0005) would be expected from implementing the Proposed Action demolition- (construction-) related

activities from causes that include falls, exposure to harmful substances, fires and explosions, and being struck by objects, equipment, or projectiles.

Based upon calculations of risks for 20 workers over 10 months for the Disassembly Alternative, no deaths (0.0007) would be expected from causes that include falls, exposure to harmful substances, fires and explosions, and being struck by objects, equipment, or projectiles as based on the average fatality rate in the U.S. for this type of work (Saltzman 2001). The risk of death for the Disassembly Alternative is only slightly higher than for the Proposed Action.

5.3 Transportation Hazards

Transportation activities could involve the transport of debris (mostly concrete, gabion rock, and sediment) that would result from FRS demolition activities up to the 3-ac (1.2 ha) staging area located along Pajarito Road. Depending on which alternative is selected, between approximately 3,680 and 5,892 loads could be transported. Part (up to 2,505 loads) of this total could be hazardous waste if any accumulations of chemicals or radionuclides in the sediment were to occur; however, the dilution factor would likely be so great within the sediments that it is unlikely that the sediment would be considered hazardous or radioactive wastes requiring special management and disposal. Of the different types of transportation occupations nationwide, truck drivers of all types of trucks experience the highest fatality rate (26 deaths per 100,000 full-time workers per year) (Saltzman 2001). The chance of a fatality occurring to a driver of a medium or heavy truck hauling hazardous waste is about three in one million (2.7×10^{-6} per driver per year) based on 1993 nationwide statistics (NSC 1994). No statistics were found for trucks hauling waste on special roads such as the access road described in Chapter 2; however, the long distances and higher speeds that are included in the national statistics would not occur in this project and the number of driver-years would be very low; therefore, no transportation fatalities are expected for this project under any of the alternatives considered.